# IB887

Intel Atom 945GSE
3.5-inch Embedded Board

# USER'S MANUAL

Version 1.0

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# Table of Contents


## Introduction ..... 1

Product Description ..... 1
Checklist ..... 2
IB887 Specifications ..... 3
Board Dimensions ..... 4

## Installations ..... 5

Installing the Memory ..... 6
Setting the Jumpers ..... 7
Connectors on IB887 ..... 11

## BIOS Setup ..... 19

## Drivers Installation ..... 43

Intel Chipset Software Installation Utility ..... 44
VGA Drivers Installation ..... 45
Realtek High Definition Audio Driver Installation ..... 46
LAN Drivers Installation ..... 48

## Appendix ..... 52

A. I/O Port Address Map ..... 52
B. Interrupt Request Lines (IRQ) ..... 53
C. Watchdog Timer Configuration ..... 54

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# Introduction

## Product Description

The IB887 is a small footprint single board computer that is configured with the Intel Atom processor N270 at 1.6GHz, FSB533 and the Mobile Intel 945GSE Express Chipset with the ICH7M.

This 3.5-inch disk-size embedded board provides greater flexibility for developers of embedded computing solutions. It is ideally suited for rugged and compact designs as in Internet devices and applications in automation, industrial control, data acquisition, thin client and other embedded PC applications.

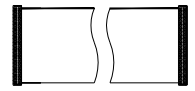
IB887 features the Intel's Graphics Media Accelerator 950 core, making it compatible with Windows Vista Premium, and Chrontel CH7308 for 24-bit dual LVDS channel. One DDR2 SO-DIMM on board implements up to 1GB of system memory. Dual Gigabit LAN is also available.

Advanced connectivity and expansion interfaces are provided by one IDE, one high-speed SATA-II, two serial ports, four USB 2.0 ports and a CF socket. Dimensions of the board are 102x147mm.

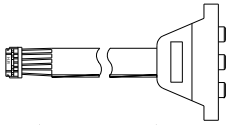
# Checklist

Your IB887 package should include the items listed below.

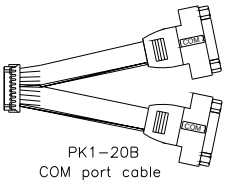
- The IB887 embedded board
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Cables are (shown below) optional.



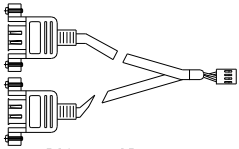
IDE28 – IDE 44–pin cable



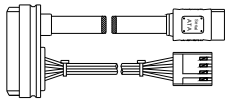
Audio–18 – Audio 5.1 channel



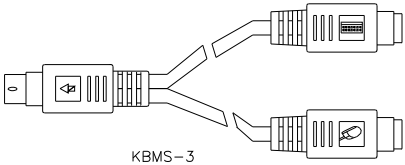
PK1–20B
COM port cable



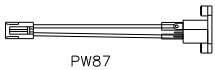
UB29 – USB cable



SATA–12
SATA & Power cable



KBMS–3
Keyboard/Mouse cable

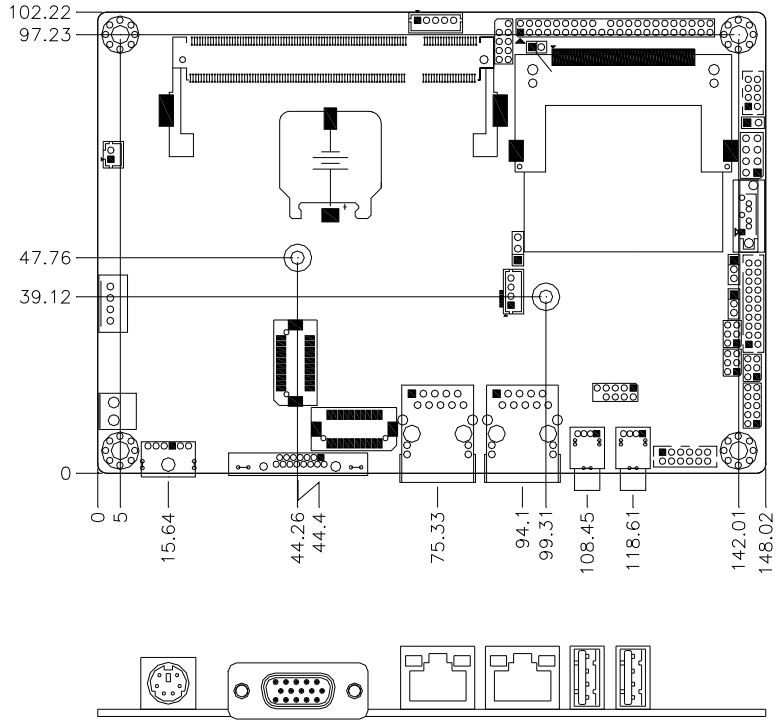


PW87
CD–in power cable

# IB887 Specifications

| | |
|---|---|
| **CPU Type** | Intel New architecture CPU on 45nm processor<br>**- Intel® Atom™ processor N270 (code name Diamondville)** |
| **CPU Speed/FSB** | CPU Clock speed = 1.60GHz<br>FSB=533MHz<br>L2 Cache=512K |
| **Green /APM** | APM1.2 |
| **BIOS** | Award BIOS: supports ACPI Function |
| **Chipset** | Intel **945GSE** Chipset<br>GMCH: QG82945GSE 27 mm x 27 mm -998-pin FCBGA<br>ICH7M: NH82801GBM 31mm x 31mm -652-pin BGA |
| **Memory** | DDRII 533 SO-DIMM x 1 (w/o ECC function), supports Single channel., Max. 1GB |
| **VGA** | 945GSE built-in, Intel® Graphics Media Accelerator 950 Graphics Core, Supports CRT w/ D-Sub 15-pin |
| **LVDS** | CH7308 x 1 onboard Chrontel<br>24-bit dual channel LVDS interface w/ DF13 socket x2 |
| **LAN** | PIC-E Intel® 82574L Gigabit LAN x 2 |
| **USB** | ICH7M built-in USB 2.0 host controller, support 4 ports, |
| **Audio** | ICH7M built-in Audio controller + HD Codec ALC662 w/ 6 channels (Line-out, Line-in, Microphone.) |
| **IDE** | ICH7M built-in Ultra DMA 33, 44-pin box-header x1 for IDE1, CF type II |
| **SATA** | ICH7M built-in SATA controller, supports 1 ports |
| **LPC I/O** | Winbond 83627EHG:<br>- COM1 (RS232), COM2 (RS232/422/485),<br>- Hardware monitor (3 thermal inputs, 6 voltage monitor inputs)<br>- KB/Mouse Connector (KB 1$^{ST}$ Priority) |
| **RTC/CMOS** | ICH7M built-in with on board Lithium Battery |
| **Edge Connector** | PS/2 connector x1 for PS/2 KB/Mouse<br>CRT x1 (D-Sub 15)<br>RJ45 x2 for LAN<br>USB connector x2 for USB1/2 |
| **On Board Header / Connectors** | DF13 socket x2 for LVDS<br>DF11 8-pin header for 2 USB ports<br>44-pin box header x1 for IDE<br>CF type II connector<br>DF11 20-pin header x 1 for COM1/COM2<br>DF11 16-pin header x 1 for Audio<br>SATA connector X1<br>4-pin SATA power connector |
| **Power Connector** | 2-pin DC Power connector x1 |
| **Digital I/O** | 4 in / 4 out |
| **Watchdog Timer** | Yes (256 segments, 0, 1, 2…255. sec/min) |
| **Board Size** | 102 x147mm |

# Board Dimensions



# Installations

This section provides information on how to use the jumpers and connectors on the IB887 in order to set up a workable system. The topics covered are:

Installing the Memory ..... 6
Setting the Jumpers..... 7
Connectors on IB887..... 11

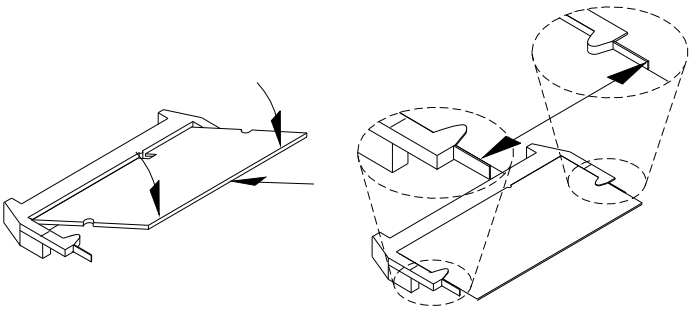
# Installing the Memory

The IB887 board supports one DDR2 memory socket that can support up to 1GB memory, DDR2 400/533 (w/o ECC function).

**Installing and Removing Memory Modules**

To install the DDR2 modules, locate the memory slot on the board and perform the following steps:

1. Hold the DDR2 module so that the key of the DDR2 module aligns with that on the memory slot. Insert the module into the socket at a slight angle (approximately 30 degrees). Note that the socket and module are both keyed, which means that the module can be installed only in one direction.
2. To seat the memory module into the socket, apply firm and even pressure to each end of the module until you feel it slip down into the socket.
3. With the module properly seated in the socket, rotate the module downward. Continue pressing downward until the clips at each end lock into position.
4. To remove the DDR2 module, press the clips with both hands.

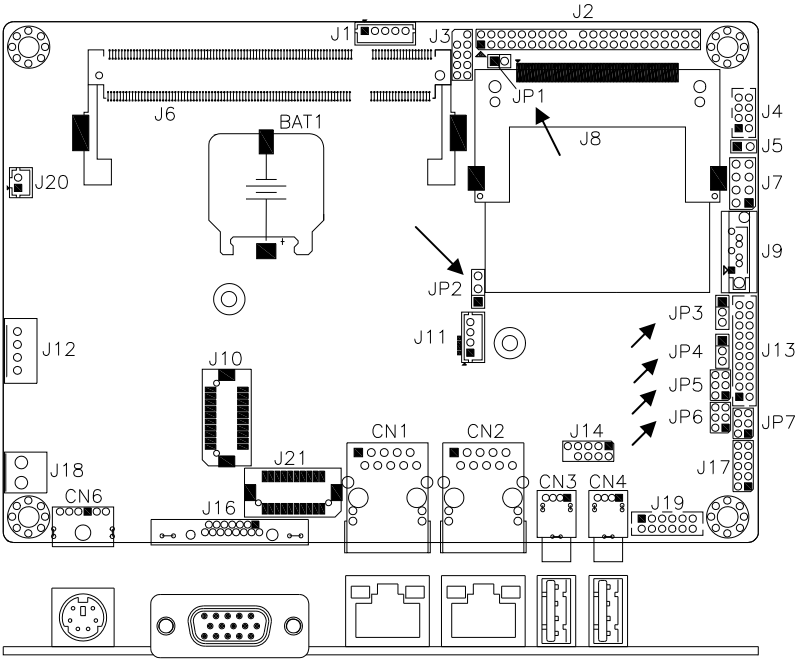


# Setting the Jumpers

Jumpers are used on IB887 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on IB887 and their respective functions.

Jumper Locations on IB887 ..... 8
JP1: CompactFlash Slave/Master Selection ..... 9
JP2: LCD Panel Power Selection ..... 9
JP3: Clear CMOS Setting ..... 9
JP4: ATX or AT Power Selection ..... 9
JP5, JP6, JP7: RS232/422/485 (COM2) Selection ..... 10

### Jumper Locations on IB887




Jumpers on IB887 ..... Page
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JP5, JP6, JP7: RS232/422/485 (COM2) Selection ..... 10

### JP1: CompactFlash Slave/Master Selection

| JP1 | CF Setting |
|---|---|
| | Master |
| | Slave |

### JP2: LCD Panel Power Selection

| JP2 | LCD Panel Power |
|---|---|
| | 3.3V |
| | 5V |

### JP3: Clear CMOS Setting

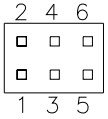
| JP3 | Setting |
|---|---|
| | Normal |
| | Clear CMOS |

### JP4: ATX or AT Power Selection

| JP4 | ATX Power |
|---|---|
| | ATX |
| | AT |

### JP5, JP6, JP7: RS232/422/485 (COM2) Selection

COM1 is fixed for RS-232 use only. COM2 is selectable for RS232, RS-422 and RS-485.The following describes the settings for COM2.




| COM2 Function | RS-232 | RS-422 | RS-485 |
|---|---|---|---|
| Jumper Setting (pin closed) | JP7: 1-2<br>JP6: 3-5 & 4-6<br>JP5: 3-5 & 4-6 | JP7: 3-4<br>JP6: 1-3 & 2-4<br>JP5: 1-3 & 2-4 | JP7: 5-6<br>JP6: 1-3 & 2-4<br>JP5: 1-3 & 2-4 |

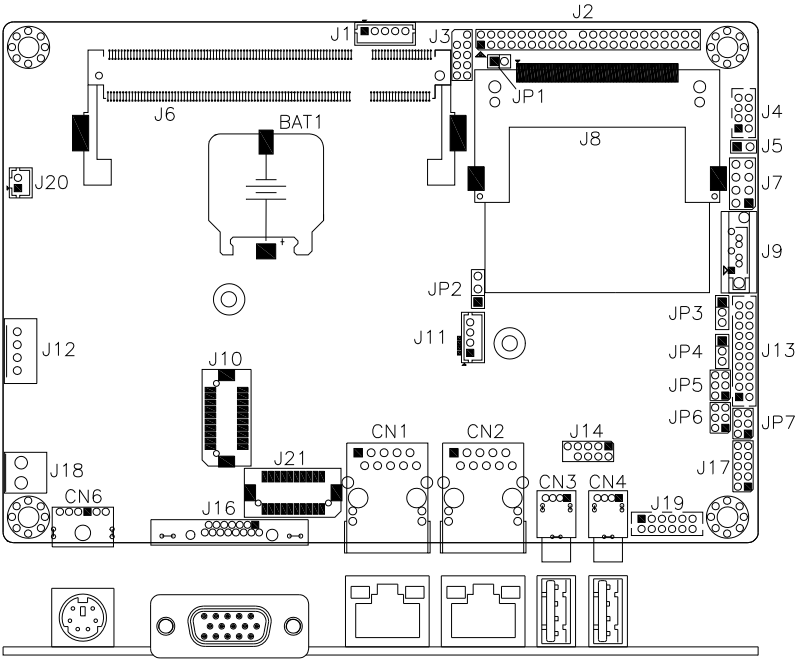
COM2 is jumper selectable for RS-232, RS-422 and RS-485.

| Pin # | Signal Name | | |
|---|---|---|---|
| | RS-232 | R2-422 | RS-485 |
| 11 | DCD | TX- | DATA- |
| 13 | RX | TX+ | DATA+ |
| 15 | TX | RX+ | NC |
| 17 | DTR | RX- | NC |
| 19 | Ground | Ground | Ground |
| 12 | DSR | NC | NC |
| 14 | RTS | NC | NC |
| 16 | CTS | NC | NC |
| 18 | RI | NC | NC |
| 20 | NC | NC | NC |

# Connectors on IB887

Connector Locations on IB887 ..... 12
CN3, CN4: USB0/1 Ports ..... 13
CN1, CN2: GbE RJ45 Ports ..... 13
CN6: PS/2 Keyboard/Mouse Connector ..... 13
J18: DC-IN 12V Power Connector ..... 13
J1: Smart Battery Interface Connector ..... 14
J2: IDE Connector ..... 14
J3: SPI Flash Connector (factory use only) ..... 14
J4: USB2/USB3 Connector (DF11 type) ..... 15
J5: Speaker ..... 15
J7: System Function Connector ..... 15
J8: CF Socket ..... 16
J9: SATA Connector ..... 16
J10, J21: LVDS Connectors (DF13 type) ..... 16
J11: LCD Backlight Connector (DC type) ..... 16
J12: HDD Power Connector ..... 16
J13: COM1, COM2 Serial Port (DF11 type) ..... 17
J14: LPC 80 Port Connector (debug use) ..... 17
J16: VGA Connector (D-sub, 15-pin) ..... 17
J17: Digital I/O ..... 17
J19: Audio Connector (DF11 type) ..... 18

## Connector Locations on IB887

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J5: Speaker ..... 15
J7: System Function Connector ..... 15
J8: CF Socket ..... 16
J9: SATA Connector ..... 16
J10, J21: LVDS Connectors (DF13 type) ..... 16
J11: LCD Backlight Connector (DC type) ..... 16
J12: HDD Power Connector ..... 16
J13: COM1, COM2 Serial Port (DF11 type) ..... 17
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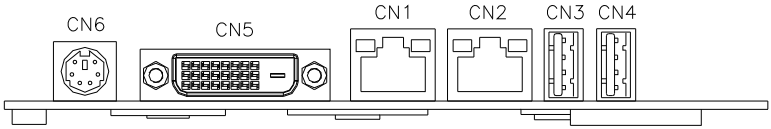
J19: Audio Connector (DF11 type) ..... 18




### CN3, CN4: USB0/1 Ports

### CN1, CN2: GbE RJ45 Ports

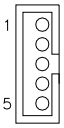
### CN6: PS/2 Keyboard/Mouse Connector

| Pin # | Signal Name |
|---|---|
| 1 | Keyboard data |
| 2 | Mouse data |
| 3 | GND |
| 4 | 5V |
| 5 | Keyboard clock |
| 6 | Mouse clock |

### J18: DC-IN 12V Power Connector

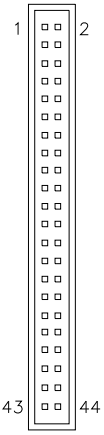
| Pin # | Signal Name |
|---|---|
| 1 | DC in (12V only) |
| 2 | Ground |

### J1: Smart Battery Interface Connector




| Pin # | Signal Name |
|---|---|
| 1 | RST |
| 2 | EXTSMI |
| 3 | Ground |
| 4 | DATA |
| 5 | CLK |

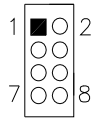
### J2: IDE Connector




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| Reset IDE | 1 | 2 | Ground |
| Host data 7 | 3 | 4 | Host data 8 |
| Host data 6 | 5 | 6 | Host data 9 |
| Host data 5 | 7 | 8 | Host data 10 |
| Host data 4 | 9 | 10 | Host data 11 |
| Host data 3 | 11 | 12 | Host data 12 |
| Host data 2 | 13 | 14 | Host data 13 |
| Host data 1 | 15 | 16 | Host data 14 |
| Host data 0 | 17 | 18 | Host data 15 |
| Ground | 19 | 20 | Key |
| DRQ0 | 21 | 22 | Ground |
| Host IOW | 23 | 24 | Ground |
| Host IOR | 25 | 26 | Ground |
| IOCHRDY | 27 | 28 | Host ALE |
| DACK0 | 29 | 30 | Ground |
| IRQ14 | 31 | 32 | No connect |
| Address 1 | 33 | 34 | No connect |
| Address 0 | 35 | 36 | Address 2 |
| Chip select 0 | 37 | 38 | Chip select 1 |
| Activity | 39 | 40 | Ground |
| Vcc | 41 | 42 | Vcc |
| Ground | 43 | 44 | N.C. |

### J3: SPI Flash Connector (factory use only)

### J4: USB2/USB3 Connector (DF11 type)




| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| Vcc | 1 | 2 | Ground |
| D0- | 3 | 4 | D1+ |
| D0+ | 5 | 6 | D1- |
| Ground | 7 | 8 | Vcc |

***Note: This USB connector is compatible with USB 2.0 devices only.***

### J5: Speaker

| Pin # | Signal Name |
|---|---|
| 1 | +5V |
| 2 | Speaker |

### J7: System Function Connector

**ATX Power ON Switch: Pins 1 and 2**
This 2-pin connector is an "ATX Power Supply On/Off Switch" on the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.

**Power LED: Pins 3 and 4**

| Pin # | Signal Name |
|---|---|
| 3 | Vcc |
| 4 | Ground |

**Hard Disk Drive LED Connector: Pins 5 and 6**
This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

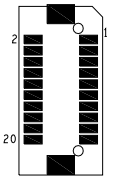
| Pin # | Signal Name |
|---|---|
| 6 | HDD Active |
| 5 | Vcc |

**Reset Switch: Pins 7 and 8**
The reset switch allows the user to reset the system without turning the main power switch off and then on again.

### J8: CF Socket

### J9: SATA Connector

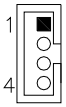
### J10, J21: LVDS Connectors (DF13 type)




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| TX0- | 2 | 1 | TX0+ |
| Ground | 4 | 3 | Ground |
| TX1- | 6 | 5 | TX1+ |
| *5V/3.3V | 8 | 7 | Ground |
| TX3- | 10 | 9 | TX3+ |
| TX2- | 12 | 11 | TX2+ |
| Ground | 14 | 13 | Ground |
| TXC- | 16 | 15 | TXC+ |
| *5V/3.3V | 18 | 17 | ENABKL |
| +12V | 20 | 19 | +12V |

***Remarks: These connectors support 24-bit.***
***J10 is 1st channel. J21 is 2nd channel.***
***JP2 can be used to set 3.3V or 5V.***

### J11: LCD Backlight Connector (DC type)



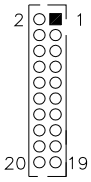

| Pin # | Signal Name |
|---|---|
| 1 | +12V |
| 2 | Backlight Enable |
| 3 | *Backlight Adj (DC type) |
| 4 | Ground |

**** LCD backlight can be controlled by the OS.***

### J12: HDD Power Connector

| Pin # | Signal Name |
|---|---|
| 1 | +5V |
| 2 | Ground |
| 3 | Ground |
| 4 | +12V |

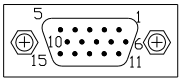
### J13: COM1, COM2 Serial Port (DF11 type)




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| DSR1<br>Data set ready | 2 | 1 | DCD1<br>Data carrier detect |
| RTS1<br>Request to send | 4 | 3 | RXD1<br>Receive data |
| CTS1<br>Clear to send | 6 | 5 | TXD1<br>Transmit data |
| RI1<br>Ringing indicator | 8 | 7 | DTR1<br>Data terminal ready |
| Not used | 10 | 9 | Ground |
| DSR2 | 12 | 11 | DCD2 |
| RTS2 | 14 | 13 | RXD2 |
| CTS2 | 16 | 15 | TXD2 |
| RI2 | 18 | 17 | DTR2 |
| Not used | 20 | 19 | Ground |

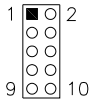
### J14: LPC 80 Port Connector (debug use)

### J16: VGA Connector (D-sub, 15-pin)



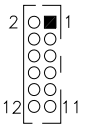

| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| Red | 1 | 2 | Green |
| Blue | 3 | 4 | N.C. |
| GND | 5 | 6 | GND |
| GND | 7 | 8 | GND |
| VCC | 9 | 10 | GND |
| N.C. | 11 | 12 | DDCDATA |
| HSYNC | 13 | 14 | VSYNC |
| DDCCLK | 15 | | |

### J17: Digital I/O




| Signal Name | Pin | Pin | Signal Name |
|---|---|---|---|
| GND | 1 | 2 | VCC |
| OUT3 | 3 | 4 | OUT1 |
| OUT2 | 5 | 6 | OUT0 |
| IN3 | 7 | 8 | IN1 |
| IN2 | 9 | 10 | IN0 |

### J19: Audio Connector (DF11 type)




| Signal Name | Pin # | Pin # | Signal Name |
|---|---|---|---|
| LINEOUT_R | 2 | 1 | LINEOUT_L |
| Ground | 4 | 3 | JD_FRONT |
| LINEIN_R | 6 | 5 | LINEIN |
| Ground | 8 | 7 | JD_LINEIN |
| MIC-In | 10 | 9 | MIC_L |
| Ground | 12 | 11 | JD_MIC1 |

# BIOS Setup

This chapter describes the different settings available in the Award BIOS that comes with the board. The topics covered in this chapter are as follows:

BIOS Introduction ..... 20
BIOS Setup ..... 20
Standard CMOS Setup ..... 22
Advanced BIOS Features ..... 25
Advanced Chipset Features ..... 28
Integrated Peripherals ..... 31
Power Management Setup ..... 35
PNP/PCI Configurations ..... 38
PC Health Status ..... 39
Frequency/Voltage Control ..... 40
Load Fail-Safe Defaults ..... 41
Load Optimized Defaults ..... 41
Set Supervisor/User Password ..... 41
Save & Exit Setup ..... 41
Exit Without Saving ..... 41

## BIOS Introduction

The Award BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also adds virus and password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

## BIOS Setup

The Award BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the Award BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

```
Press  <DEL>  to  Enter  Setup
```

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Phoenix - AwardBIOS CMOS Setup Utility

| | |
|---|---|
| Standard CMOS Features | Frequency/Voltage Control |
| Advanced BIOS Features | Load Fail-Safe Defaults |
| Advanced Chipset Features | Load Optimized Defaults |
| Integrated Peripherals | Set Supervisor Password |
| Power Management Setup | Set User Password |
| PnP/PCI Configurations | Save & Exit Setup |
| PC Health Status | Exit Without Saving |
| ESC : Quit | ↑ ↓ → ← : Select Item |
| F10 : Save & Exit Setup | |
| Time, Date, Hard Disk Type… | |

The section below the setup items of the Main Menu displays the control keys for this menu. At the bottom of the Main Menu just below the control keys section, there is another section, which displays information on the currently highlighted item in the list.

***Note**: If the system cannot boot after making and saving system changes with Setup, the Award BIOS supports an override to the CMOS settings that resets your system to its default.*

***Warning:** It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

## Standard CMOS Setup

"Standard CMOS Setup" choice allows you to record some basic hardware configurations in your computer system and set the system clock and error handling. If the board is already installed in a working system, you will not need to select this option. You will need to run the Standard CMOS option, however, if you change your system hardware configurations, the onboard battery fails, or the configuration stored in the CMOS memory was lost or damaged.

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features

| | | |
|---|---|---|
| Date (mm:dd:yy) | Wed, Apr 28, 2004 | Item Help |
| Time (hh:mm:ss) | 00 : 00 : 00 | Menu Level > |
| IDE Channel 0 Master | None | Change the day, month, |
| IDE Channel 0 Slave | None | Year and century |
| IDE Channel 1 Master | None | |
| IDE Channel 1 Slave | None | |
| Video | EGA/VGA | |
| Halt On | All, But Keyboard | |
| Base Memory | 640K | |
| Extended Memory | 129024K | |
| Total Memory | 130048K | |

At the bottom of the menu are the control keys for use on this menu. If you need any help in each item field, you can press the <F1> key. It will display the relevant information to help you. The memory display at the lower right-hand side of the menu is read-only. It will adjust automatically according to the memory changed. The following describes each item of this menu.

### Date

The date format is:

**Day :** **Sun to Sat**
**Month :** **1 to 12**
**Date :** **1 to 31**
**Year :** **1999 to 2099**

To set the date, highlight the "Date" field and use the PageUp/ PageDown or +/- keys to set the current time.

### Time

The time format is: **Hour : 00 to 23**
**Minute : 00 to 59**
**Second : 00 to 59**

To set the time, highlight the "Time" field and use the <PgUp>/ <PgDn> or +/- keys to set the current time.

### IDE Channel Master/Slave

The onboard PCI IDE connector provides Primary and Secondary channels for connecting up to two IDE hard disks or other IDE devices.

Press <Enter> to configure the hard disk. The selections include Auto, Manual, and None. Select 'Manual' to define the drive information manually. You will be asked to enter the following items.

| | |
|---|---|
| **CYLS :** | Number of cylinders |
| **HEAD :** | Number of read/write heads |
| **PRECOMP :** | Write precompensation |
| **LANDING ZONE :** | Landing zone |
| **SECTOR :** | Number of sectors |

The Access Mode selections are as follows:

| | |
|---|---|
| CHS | (HD < 528MB) |
| LBA | (HD > 528MB and supports Logical Block Addressing) |
| Large | (for MS-DOS only) |
| Auto | |

**Remarks**: The main board supports two serial ATA ports and are represented in this setting as IDE Channel 0.

### Video

This field selects the type of video display card installed in your system. You can choose the following video display cards:

| | |
|---|---|
| EGA/VGA | For EGA, VGA, SEGA, SVGA or PGA monitor adapters. (default) |
| CGA 40 | Power up in 40 column mode. |
| CGA 80 | Power up in 80 column mode. |
| MONO | For Hercules or MDA adapters. |

### Halt On

This field determines whether or not the system will halt if an error is detected during power up.

| | |
|---|---|
| No errors | The system boot will not be halted for any error that may be detected. |
| All errors | Whenever the BIOS detects a non-fatal error, the system will stop and you will be prompted. |
| All, But Keyboard | The system boot will not be halted for a keyboard error; it will stop for all other errors |
| All, But Diskette | The system boot will not be halted for a disk error; it will stop for all other errors. |
| All, But Disk/Key | The system boot will not be halted for a keyboard or disk error; it will stop for all others. |

## Advanced BIOS Features

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features

| | | |
|---|---|---|
| CPU Feature | Press Enter | ITEM HELP |
| Hard Disk Boot Priority | Press Enter | |
| Virus Warning | Disabled | Menu Level > |
| CPU L1 and L2 Cache | Enabled | |
| CPU L3 | Enabled | |
| Hyper-Threading Technology | Enabled | |
| Quick Power On Self Test | Enabled | |
| First Boot Device | Hard Disk | |
| Second Boot Device | CDROM | |
| Third Boot Device | USB-CDROM | |
| Boot Other Device | Enabled | |
| Boot Up NumLock Status | On | |
| Gate A20 Option | Fast | |
| Typematic Rate Setting | Disabled | |
| Typematic Rate (Chars/Sec) | 6 | |
| Typematic Delay (Msec) | 250 | |
| Security Option | Setup | |
| APIC Mode | Enabled | |
| MPS Version Control for OS | 1.4 | |
| OS Select For DRAM>64MB | Non-OS2 | |
| Small Logo (EPA) Show | Disabled | |

### CPU Feature

Press Enter to configure the settings relevant to CPU Feature.

### Hard Disk Boot Priority

With the field, there is the option to choose, aside from the hard disks connected, "Bootable add-in Cards" which refers to other external devices.

### Virus Warning

If this option is enabled, an alarm message will be displayed when trying to write on the boot sector or on the partition table on the disk, which is typical of the virus.

### CPU L1/L2/L3 Cache

Cache memory is additional memory that is faster than conventional DRAM (system memory). CPUs from 486-type on up contain internal cache memory, and most, but not all, modern PCs have additional (external) cache memory. When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. These allow you to enable (speed up memory access) or disable the cache function.

### Hyper-Threading Technology
By default, this field is enabled.

### Quick Power On Self Test
When enabled, this field speeds up the Power On Self Test (POST) after the system is turned on. If it is set to *Enabled*, BIOS will skip some items.

### First/Second/Third Boot Device
These fields determine the drive that the system searches first for an operating system. The options available include *Floppy*, *LS120*, *Hard Disk*, *CDROM*, *ZIP100*, *USB-Floppy*, *USB-ZIP*, *USB-CDROM*, *LAN* and *Disable*.

### Boot Other Device
These fields allow the system to search for an OS from other devices other than the ones selected in the First/Second/Third Boot Device.

### Boot Up NumLock Status
This allows you to activate the NumLock function after you power up the system.

### Gate A20 Option
This field allows you to select how Gate A20 is worked. Gate A20 is a device used to address memory above 1 MB.

### Typematic Rate Setting
When disabled, continually holding down a key on your keyboard will generate only one instance. When enabled, you can set the two typematic controls listed next. By default, this field is set to ***Disabled.***

### Typematic Rate (Chars/Sec)
When the typematic rate is enabled, the system registers repeated keystrokes speeds. Settings are from 6 to 30 characters per second.

### Typematic Delay (Msec)
When the typematic rate is enabled, this item allows you to set the time interval for displaying the first and second characters. By default, this item is set to ***250msec.***

### Security Option

This field allows you to limit access to the System and Setup. The default value is ***Setup***. When you select *System,* the system prompts for the User Password every time you boot up. When you select *Setup,* the system always boots up and prompts for the Supervisor Password only when the Setup utility is called up.

### APIC Mode

APIC stands for Advanced Programmable Interrupt Controller. The default setting is ***Enabled***.

### MPS Version Control for OS

This option is specifies the MPS (Multiprocessor Specification) version for your operating system. MPS version 1.4 added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability. The default setting is ***1.4***.

### OS Select for DRAM > 64MB

This option allows the system to access greater than 64MB of DRAM memory when used with OS/2 that depends on certain BIOS calls to access memory. The default setting is ***Non-OS/2***.

### Small Logo (EPA) Show

The EPA logo appears at the right side of the monitor screen when the system is boot up.

## Advanced Chipset Features

This Setup menu controls the configuration of the chipset.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features

| | | |
|---|---|---|
| DRAM Timing Selectable | By SPD | ITEM HELP |
| CAS Latency Time | Auto | Menu Level > |
| DRAM RAS# to CAS# Delay | Auto | |
| DRAM RAS# Precharge | Auto | |
| Precharge delay (tRAS) | Auto | |
| System Memory Frequency | Auto | |
| SLP_S4# Assertion Width | 1 to 2 Sec | |
| System BIOS Cacheable | Enabled | |
| Video BIOS Cacheable | Disabled | |
| Memory Hole at 15M-16M | Disabled | |
| PCI Express Root Port Func | Press Enter | |
| ** VGA Setting ** | | |
| On-Chip Frame Buffer Size | 8MB | |
| DVMT Mode | DVMT | |
| DVMT/FIXED memory Size | 128MB | |
| SDVO Device Setting | LVDS | |
| SDVO LVDS Protocol | 1 Ch SPGW 18 bit | |
| SDVO Panel Number | 1024x768 | |
| Boot Display | CRT+LVDS | |

### DRAM Timing Selectable

This option refers to the method by which the DRAM timing is selected. The default is ***By SPD***.

### CAS Latency Time

You can configure CAS latency time in HCLKs as 2 or 2.5 or 3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU.

### DRAM RAS# to CAS# Delay

This option allows you to insert a delay between the RAS (Row Address Strobe) and CAS (Column Address Strobe) signals. This delay occurs when the SDRAM is written to, read from or refreshed. Reducing the delay improves the performance of the SDRAM.

### DRAM RAS# Precharge

This option sets the number of cycles required for the RAS to accumulate its charge before the SDRAM refreshes. The default setting for the Active to Precharge Delay is ***Auto***.

### Precharge Delay (tRAS)
The default setting for the Precharge Delay is ***Auto***.

### System Memory Frequency
The default setting is ***Auto***.

### SLP_S4# Assertion Width
The default setting is ***1 to 2 Sec***.

### System BIOS Cacheable
The setting of *Enabled* allows caching of the system BIOS ROM at F000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

### Video BIOS Cacheable
The Setting *Enabled* allows caching of the video BIOS ROM at C0000h-F7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

### Memory Hole At 15M-16M
In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB. The choices are *Enabled* and *Disabled*.

### On-Chip VGA Setting
The fields under the On-Chip VGA Setting and their default settings are:

On-Chip Frame Buffer Size: 8MB
DVMT Mode: DVMT
DVMT/Fixed Memory Size: 128MB
SDVO Device Setting: LVDS
SDVO LCDS Protocol: 1 Ch SPGW 18 bit
SDVO Panel Number: 1024x768
Boot Display: CRT+LVDS

The options under the SDVO LCDS Protocol field include:

1 Ch SPGW 18 bit
2 Ch SPGW 18 bit
1 Ch OpenLDI 18 bit
2 Ch OpenLDI 18 bit
1 Ch SPGW 24 bit
2 Ch SPGW 24 bit
1 Ch OpenLDI 24 bit
2 Ch OpenLDI 24 bit

### SDVO Panel Number

This field allows you to select the SDVO Panel type. The default values for these ports are:

640x480
852x480
800x600
1024x768
1280x1024
1280x800
1366x768
1440x900
1600x1200
1920x1080
1920x1200

## Integrated Peripherals

This section sets configurations for your hard disk and other integrated peripherals. The first screen shows three main items for user to select. Once an item selected, a submenu appears. Details follow.

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals

| | | |
|---|---|---|
| OnChip IDE Device | Press Enter | ITEM HELP |
| Onboard Device | Press Enter | Menu Level > |
| SuperIO Device | Press Enter | |

Phoenix - AwardBIOS CMOS Setup Utility
**OnChip IDE Device**

| | | |
|---|---|---|
| IDE HDD Block Mode | Enabled | ITEM HELP |
| IDE DMA Transfer Access | Enabled | |
| On-chip Primary PCI IDE | Auto | Menu Level > |
| IDE Primary Master PIO | Auto | |
| IDE Primary Slave PIO | Auto | |
| IDE Primary Master UDMA | Auto | |
| IDE Primary Slave UDMA | Auto | |
| On-Chip Secondary PCI IDE | Enabled | |
| IDE Secondary Master PIO | Auto | |
| IDE Secondary Slave PIO | Auto | |
| IDE Secondary Master UDMA | Auto | |
| IDE Secondary Slave UDMA | Auto | |
| | | |
| *** On-Chip Serial ATA Setting *** | | |
| SATA Mode | IDE | |
| On-Chip Serial ATA | Auto | |
| PATA IDE Mode | Secondary | |
| SATA port | P0, P2 is Primary | |

Phoenix - AwardBIOS CMOS Setup Utility
**Onboard Device**

| | | |
|---|---|---|
| USB Controller | Enabled | ITEM HELP |
| USB 2.0 Controller | Enabled | Menu Level > |
| USB Keyboard Support | Enabled | |
| AC97 Audio Select | Auto | |

Phoenix - AwardBIOS CMOS Setup Utility
**SuperIO Device**

| | | |
|---|---|---|
| POWER ON Function | BUTTON ONLY | ITEM HELP |
| KB Power ON Password | Enter | |
| Hot Key power ON | Ctrl-F1 | |
| Onboard FDC Controller | Enabled | |
| Onboard Serial Port 1 | 3F8/IRQ4 | Menu Level > |
| Onboard Serial Port 2 | 2F8/IRQ3 | |
| UART Mode Select | Normal | |
| PWRON After PWR-Fail | Off | |

### IDE HDD Block Mode
This field allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive.

### IDE DMA Transfer Access
By default, this field is enabled.

### On-chip Primary PCI IDE Enabled
By default, this field is enabled.

### OnChip Primary/Secondary PCI IDE
The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately.

### IDE Primary/Secondary Master/Slave PIO
These fields allow your system hard disk controller to work faster. Rather than have the BIOS issue a series of commands that transfer to or from the disk drive, PIO (Programmed Input/Output) allows the BIOS to communicate with the controller and CPU directly.

The system supports five modes, numbered from 0 (default) to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.

### IDE Primary/Secondary Master/Slave UDMA
These fields allow your system to improve disk I/O throughput to 33Mb/sec with the Ultra DMA/33 feature. The options are *Auto* and *Disabled*.

### On-Chip Serial ATA Setting

The fields under the SATA setting include:

| | |
|---|---|
| SATA Mode | IDE; (other setting is AHCI) |
| On-Chip Serial ATA | Auto |
| PATA IDE Mode | Secondary |
| SATA port | P0, P2 is Primary |

### USB Controller

The options for this field are *Enabled* and *Disabled*. By default, this field is set to ***Enabled***.

### USB 2.0 Controller

The options for this field are *Enabled* and *Disabled*. By default, this field is set to ***Enabled***. In order to use USB 2.0, necessary OS drivers must be installed first. ***Please update your system to Windows 2000 SP4 or Windows XP SP2.***

### USB Keyboard Support

The options for this field are *Enabled* and *Disabled*.

### AC97 Audio Select

This field, by default, is set to ***Auto***.

### Power ON Function

This field is related to how the system is powered on – such as with the use of conventional power button, keyboard or hot keys. The default is ***BUTTON ONLY***.

### KB Power ON Password

This field allows users to set the password when keyboard power on is the mode of the Power ON function.

### Hot Key Power ON

This field sets certain keys, also known as hot keys, on the keyboard that can be used as a 'switch' to power on the system.

### Onboard Serial Port

These fields allow you to select the onboard serial ports and their addresses. The default values for these ports are:

| | |
|---|---|
| Serial Port 1 | 3F8/IRQ4 |
| Serial Port 2 | 2F8/IRQ3 |

### UART Mode Select

This field determines the UART 2 mode in your computer. The default value is ***Normal***.

### PWRON After PWR-Fail

This field sets the system power status whether *on or off* when power returns to the system from a power failure situation.

## Power Management Setup

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup

| | | ITEM HELP |
|---|---|---|
| Power-Supply Type | ATX | |
| ACPI Function | Enabled | |
| ACPI Suspend | S3(STR) | |
| RUN VGABIOS if S3 Resume | Auto | Menu Level > |
| Power Management | User Define | |
| Video Off Method | V/H SYNC+Blank | |
| Video Off In Suspend | Yes | |
| Suspend Type | Stop Grant | |
| Modem Use IRQ | 3 | |
| Suspend Mode | Disabled | |
| HDD Power Down | Disabled | |
| Soft-Off by PWR-BTTN | Instant-Off | |
| CPU THRM-Throttling | 75% | |
| Wake-Up by PCI Card | Disabled | |
| Power On by Ring | Disabled | |
| Resume by Alarm | Disabled | |
| Date (of Month) Alarm | 0 | |
| Time (hh:mm:ss) Alarm | 0 : 0 : 0 | |
| ** Reload Global Timer Events ** | | |
| Primary IDE 0 | Disabled | |
| Primary IDE 1 | Disabled | |
| Secondary IDE 0 | Disabled | |
| Secondary IDE 1 | Disabled | |
| FDD, COM, LPT Port | Disabled | |
| PCI PIRQ[A-D] # | Disabled | |

### Power Supply Type
The default setting is ***ATX***. The other setting is AT mode.

### ACPI Function
Enable this function to support ACPI (Advance Configuration and Power Interface).

### ACPI Suspend
The default setting of the ACPI Suspend mode is ***S3(STR)***.

### RUN VGABIOS if S3 Resume
The default setting of this field is ***Auto***.

### Power Management

This field allows you to select the type of power saving management modes. There are four selections for Power Management.

| | |
|---|---|
| Min. Power Saving | Minimum power management |
| Max. Power Saving | Maximum power management. |
| User Define | Each of the ranges is from 1 min. to 1hr. Except for HDD Power Down which ranges from 1 min. to 15 min. |

### Video Off Method

This field defines the Video Off features. There are three options.

| | |
|---|---|
| V/H SYNC + Blank | Default setting, blank the screen and turn off vertical and horizontal scanning. |
| DPMS | Allows BIOS to control the video display. |
| Blank Screen | Writes blanks to the video buffer. |

### Video Off In Suspend

When enabled, the video is off in suspend mode. The default setting is ***Yes***.

### Suspend Type

The default setting for the Suspend Type field is ***Stop Grant***.

### Modem Use IRQ

This field sets the IRQ used by the Modem. By default, the setting is ***3***.

### Suspend Mode

When enabled, and after the set time of system inactivity, all devices except the CPU will be shut off.

### HDD Power Down

When enabled, and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

### Soft-Off by PWRBTN

This field defines the power-off mode when using an ATX power supply. The *Instant Off* mode allows powering off immediately upon pressing the power button. In the *Delay 4 Sec* mode, the system powers off when the power button is pressed for more than four seconds or enters the suspend mode when pressed for less than 4 seconds.

### CPU THRM-Throttling
By default, this field is set to ***75%***.

### Wake up by PCI Card
By default, this field is disabled.

### Power On by Ring
This field enables or disables the power on of the system through the modem connected to the serial port or LAN.

### Resume by Alarm
This field enables or disables the resumption of the system operation. When enabled, the user is allowed to set the *Date* and *Time*.

### Reload Global Timer Events
The HDD, FDD, COM, LPT Ports, and PCI PIRQ are I/O events that can prevent the system from entering a power saving mode or can awaken the system from such a mode. When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

## PNP/PCI Configurations

This option configures the PCI bus system. All PCI bus systems on the system use INT#, thus all installed PCI cards must be set to this value.

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

| | | |
|---|---|---|
| Reset Configuration Data | Disabled | ITEM HELP |
| Resources Controlled By | Auto (ESCD) | Menu Level |
| IRQ Resources | Press Enter | |
| PCI/VGA Palette Snoop | Disabled | Select Yes if you are using a Plug and Play capable operating system Select No if you need the BIOS to configure non-boot devices |
| **PCI Express relative items** | | |
| Maximum Payload Size | 128 | |

### Reset Configuration Data

This field allows you to determine whether to reset the configuration data or not. The default value is ***Disabled.***

### Resources Controlled by

This PnP BIOS can configure all of the boot and compatible devices with the use of a PnP operating system such as Windows 95.

### PCI/VGA Palette Snoop

Some non-standard VGA display cards may not show colors properly. This field allows you to set whether or not MPEG ISA/VESA VGA cards can work with PCI/VGA. When this field is enabled, a PCI/VGA can work with an MPEG ISA/VESA VGA card. When this field is disabled, a PCI/VGA cannot work with an MPEG ISA/VESA card.

### Maximum Payload Size

The default setting of the PCI Express Maximum Payload Size is 128.

## PC Health Status

This section shows the parameters in determining the PC Health Status. These parameters include temperatures, fan speeds and voltages.

Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status

| | | ITEM HELP |
|---|---|---|
| Shutdown Temperature | 90°C/194°F | |
| CPU Warning Temperature | 80°C/176°F | Menu Level > |
| Current System Temp | 45°C/113°F | |
| Current CPU Temp | 45°C/113°F | |
| Vcore(V) | 1.02 V | |
| 12 V | 1.32 V | |
| 1.8V | 1.8V | |
| +5V | 5.25 V | |
| 3.3V | 3.37V | |
| VBAT (V) | 3.21 V | |
| 5VSB(V) | 5.67 V | |

### Shutdown Temperature

This field allows the user to set the temperature by which the system automatically shuts down once the threshold temperature is reached. This function can help prevent damage to the system that is caused by overheating.

### CPU Warning Temperature

This field allows the user to set the temperature so that when the temperature is reached, the system sounds a warning. This function can help prevent damage to the system that is caused by overheating.

### Temperatures/Voltages

These fields are the parameters of the hardware monitoring function feature of the board. The values are read-only values as monitored by the system and show the PC health status.

## Frequency/Voltage Control

This section shows the user how to configure the processor frequency.

Phoenix - AwardBIOS CMOS Setup Utility
Frequency/Voltage Control

| | | |
|---|---|---|
| Auto Detect PCI Clk | Disabled | ITEM HELP |
| Spread Spectrum | Disabled | Menu Level > |
| CPU Host/SRC PCI Clock | Default | |

### Auto Detect PCI Clk

This field enables or disables the auto detection of the PCI clock.

### Spread Spectrum Modulated

This field sets the value of the spread spectrum. The default setting is ***Disabled***. This field is for CE testing use only.

### CPU Host / SRC PCI Clock

This field is set to ***Default***.

## Load Fail-Safe Defaults

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high-performance features.

## Load Optimized Defaults

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.

## Set Supervisor Password

These two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>. The Enter Password: message prompts on the screen. Type the password, up to eight characters in length, and press <Enter>. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

To disable a password, just press the <Enter> key when you are prompted to enter the password. A message will confirm the password to be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

## Save & Exit Setup

This option allows you to determine whether or not to accept the modifications. If you type “Y”, you will quit the setup utility and save all changes into the CMOS memory. If you type “N”, you will return to Setup utility.

## Exit Without Saving

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing “Y” will quit the Setup utility without saving the modifications. Typing “N” will return you to Setup utility.

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# Drivers Installation

This section describes the installation procedures for software and drivers under the Windows 2000 and Windows XP. The software and drivers are included with the board. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

Intel Chipset Software Intallation Utility ..... 44
VGA Drivers Installation ..... 45
Realtek High Definition Audio Driver Installation ..... 46
LAN Drivers Installation ..... 48

**IMPORTANT NOTE:**
After installing your Windows operating system (Windows 2000/ XP), you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

# Intel Chipset Software Installation Utility

The Intel Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation under Windows 2000/XP.

1. Insert the CD that comes with the board. Click ***Intel*** at the left side, then ***Intel(R) I945GM/GME/GSE Chipset Drivers***.

2. Click ***Intel(R) Chipset Software Installation Utility.***

3. When the welcome screen to the Intel(R) Chipset Software Installation Utility appears, click ***Next*** to continue.

4. Click ***Yes*** to accept the software license agreement and proceed with the installation process.

5. On Readme Information screen, click ***Next*** to continue the installation.

6. The Setup process is now complete. Click ***Finish*** to restart the computer and for changes to take effect.

# VGA Drivers Installation

To install the VGA drivers, follow the steps below to proceed with the installation.

1. Insert the CD that comes with the board. Click ***Intel*** at the left side, then ***Intel(R) I945GM/GME/GSE Chipset Drivers***.

2. Click ***Intel(R) I945GM/GME/GSE Chipset Family Graphics Driver.***

3. When the welcome screen of the Intel(R) Graphics Media Accelerator Driver appears, click ***Next*** to continue.

4. Click ***Yes*** to to agree with the license agreement and continue the installation.

5. Click ***Next*** in the Readme File Information window.

6. Click ***Next*** in the Setup Progress window.

7. Setup is now complete. Click ***Finish*** to restart the computer and for changes to take effect.

# Realtek High Definition Audio Driver Installation

Follow the steps below to install the Realtek High Definition Audio Drivers.

1. Insert the CD that comes with the board. Click ***Intel*** at the left side, then ***Intel(R) I945GM/GME/GSE Chipset Drivers***, and then ***Realtek Audio Driver***.

2. Click ***Realtek High Definition Codec Audio Driver.***

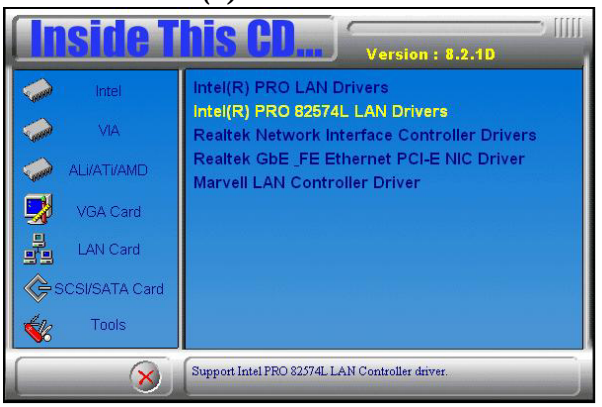
3. When the welcome screen to the InstallShield Wizard for ***Realtek High Definition Codec Audio Driver*** appears, click ***Next*** to start the installation.

4. When the InstallShieldWizard has finished performing maintenance operations on Realtek High Definition Audio Driver, click ***Finish*** to restart the computer.

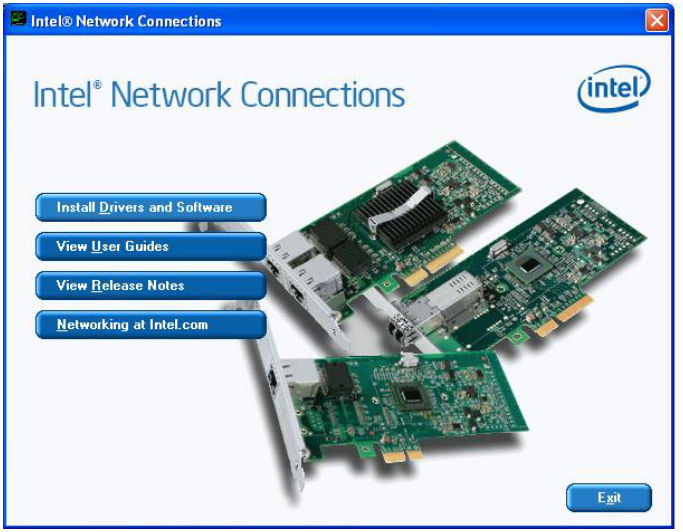
# LAN Drivers Installation

Follow the steps below to install Intel PRO LAN drivers.

1. Insert the CD that comes with the board. Click ***LAN Card*** at the left side and then ***Intel(R) PRO 82574L LAN Drivers***.



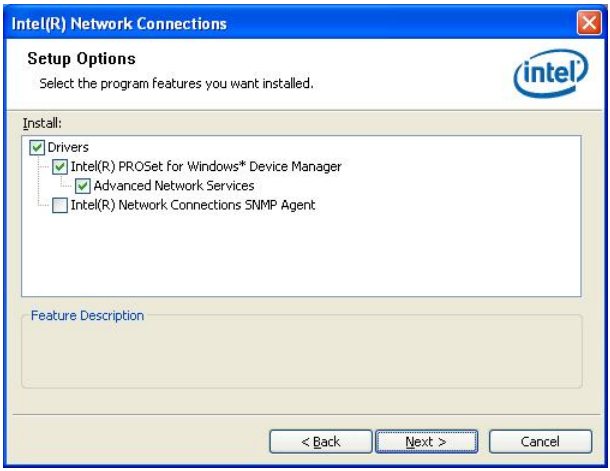

2. In the Intel® Network Connections screen*, click ***Install Drivers and Software***.




*Under Windows 2000, driver installation will require the Windows Management Instrumentation Service running in order to proceed. Refer to this information at the end of this section.

3. In the welcome screen of the InstallShield Wizard for Intel(R) Network Connections, click ***Next***.

4. In the Setup Options, click the checkbox as shown below and click ***Next***.

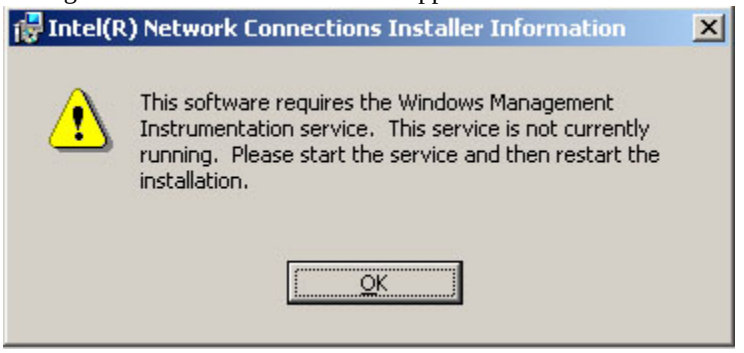



4. In the InstallShield Wizard screen, click ***Install*** to begin the installation.

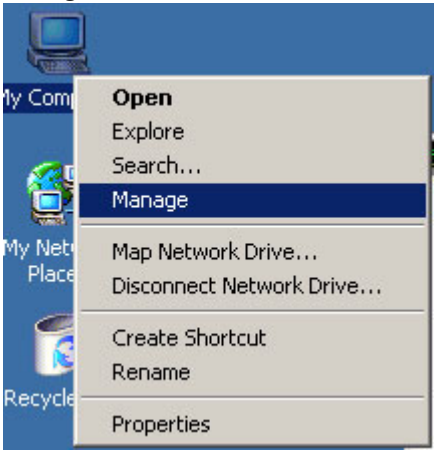
5. InstallShield Wizard is completed. Click ***Finish*** to exit the Wizard.

**The Windows Management Instrumentation Service**

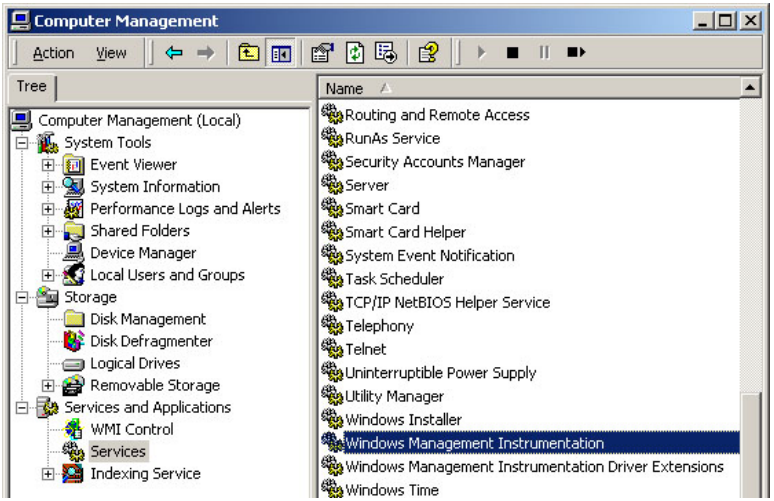
During the installation of the ***Intel(R) PRO 82574L LAN*** drivers under Windows 2000, the message below asking to start the Windows Management Instrument Service will appear.

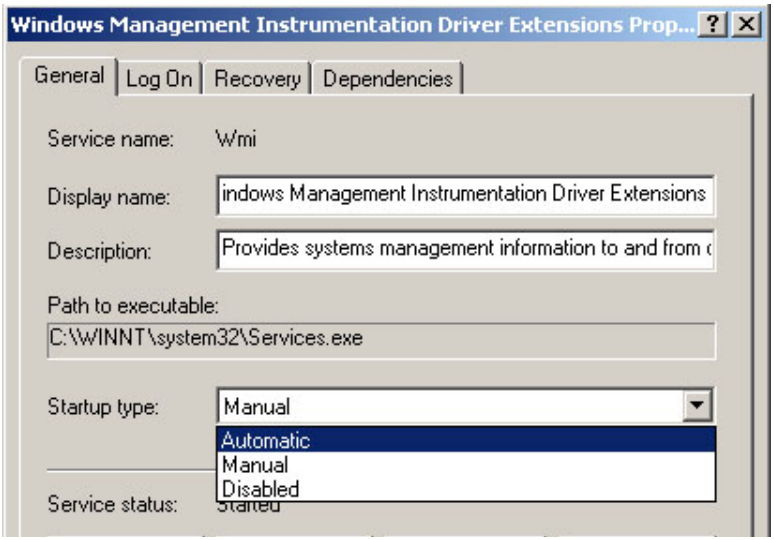



At this moment, click **OK**, and proceed to run the service requested. On the Windows desktop, right click the **My Computer** icon and click Manage.



When the Computer Management properties appear, double click **Services and Applications** tab at the bottom and then click **Services**. Double click two Services names including ***Windows Management Instrumentation*** and ***Windows Management Instrumentation Driver Extensions*** in order to configure their **Startup type** as **Automatic** as shown below. After this step, you can go back to install the LAN driver.



# Appendix

## A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

| Address | Device Description |
|---|---|
| 000h - 01Fh | DMA Controller #1 |
| 020h - 03Fh | Interrupt Controller #1 |
| 040h - 05Fh | Timer |
| 060h - 06Fh | Keyboard Controller |
| 070h - 07Fh | Real Time Clock, NMI |
| 080h - 09Fh | DMA Page Register |
| 0A0h - 0BFh | Interrupt Controller #2 |
| 0C0h - 0DFh | DMA Controller #2 |
| 0F0h | Clear Math Coprocessor Busy Signal |
| 0F1h | Reset Math Coprocessor |
| 1F0h - 1F7h | IDE Interface |
| 278 - 27F | Parallel Port #2(LPT2) |
| 2F8h - 2FFh | Serial Port #2(COM2) |
| 2B0 - 2DF | Graphics adapter Controller |
| 378h - 3FFh | Parallel Port #1(LPT1) |
| 360 - 36F | Network Ports |
| 3B0 - 3BF | Monochrome & Printer adapter |
| 3C0 - 3CF | EGA adapter |
| 3D0 - 3DF | CGA adapter |
| 3F0h - 3F7h | Floppy Disk Controller |
| 3F8h - 3FFh | Serial Port #1(COM1) |

# B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

| Level | Function |
|---|---|
| IRQ0 | System Timer Output |
| IRQ1 | Keyboard |
| IRQ2 | Interrupt Cascade |
| IRQ3 | Serial Port #2 |
| IRQ4 | Serial Port #1 |
| IRQ5 | Reserved |
| IRQ6 | Floppy Disk Controller |
| IRQ7 | Parallel Port #1 |
| IRQ8 | Real Time Clock |
| IRQ9 | Reserved |
| IRQ10 | Reserved |
| IRQ11 | Reserved |
| IRQ12 | PS/2 Mouse |
| IRQ13 | 80287 |
| IRQ14 | Primary IDE |
| IRQ15 | Secondary IDE |

# C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

```
//=====================================================================
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=====================================================================
#include <stdio.h>
#include <stdlib.h>
#include "W627EHF.H"
//=====================================================================
int main (int argc, char *argv[]);
void copyright(void);
void EnableWDT(int);
void DisableWDT(void);
//=====================================================================
int main (int argc, char *argv[])
{
        unsigned char bBuf;
        unsigned char bTime;
        char **endptr;

        copyright();

        if (argc != 2)
        {
                printf(" Parameter incorrect!!\n");
                return 1;
        }

        if (Init_W627EHF() == 0)
        {
                printf(" Winbond 83627HF is not detected, program abort.\n");
                return 1;
        }
        bTime = strtol (argv[1], endptr, 10);
        printf("System will reset after %d seconds\n", bTime);

        EnableWDT(bTime);

        return 0;
}
//=====================================================================
```

```
void copyright(void)
{
        printf("\n======== Winbond 83627EHF Watch Timer Tester (AUTO DETECT) ========\n"\
                        "       Usage : W627E_WD reset_time\n"\
                        "       Ex : W627E_WD 3  => reset system after 3 second\n"\
                        "            W627E_WD 0  => disable watch dog timer\n");
}
//=============================================================================
void EnableWDT(int interval)
{
        unsigned char bBuf;

        bBuf = Get_W627EHF_Reg( 0x2D);
        bBuf &= (!0x01);
        Set_W627EHF_Reg( 0x2D, bBuf);                   //Enable WDTO

        Set_W627EHF_LD( 0x08);                          //switch to logic device 8
        Set_W627EHF_Reg( 0x30, 0x01);                   //enable timer

        bBuf = Get_W627EHF_Reg( 0xF5);
        bBuf &= (!0x08);
        Set_W627EHF_Reg( 0xF5, bBuf);                   //count mode is second

        Set_W627EHF_Reg( 0xF6, interval);               //set timer
}
//=============================================================================
void DisableWDT(void)
{
        Set_W627EHF_LD(0x08);                           //switch to logic device 8
        Set_W627EHF_Reg(0xF6, 0x00);                    //clear watchdog timer
        Set_W627EHF_Reg(0x30, 0x00);                    //watchdog disabled
}
//=============================================================================
```

```
//=============================================================================
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=============================================================================
#include "W627EHF.H"
#include <dos.h>
//=============================================================================
unsigned int W627EHF_BASE;
void Unlock_W627EHF (void);
void Lock_W627EHF (void);
//=============================================================================
unsigned int Init_W627EHF(void)
{
	unsigned int result;
	unsigned char ucDid;

	W627EHF_BASE = 0x2E;
	result = W627EHF_BASE;

	ucDid = Get_W627EHF_Reg(0x20);
	if (ucDid == 0x88)
	{	goto Init_Finish;	}

	W627EHF_BASE = 0x4E;
	result = W627EHF_BASE;
	ucDid = Get_W627EHF_Reg(0x20);
	if (ucDid == 0x88)
	{	goto Init_Finish;	}

	W627EHF_BASE = 0x00;
	result = W627EHF_BASE;

Init_Finish:
	return (result);
}
//=============================================================================
void Unlock_W627EHF (void)
{
	outportb(W627EHF_INDEX_PORT, W627EHF_UNLOCK);
	outportb(W627EHF_INDEX_PORT, W627EHF_UNLOCK);
}
//=============================================================================
void Lock_W627EHF (void)
{
	outportb(W627EHF_INDEX_PORT, W627EHF_LOCK);
}
//=============================================================================
void Set_W627EHF_LD( unsigned char LD)
{
	Unlock_W627EHF();
	outportb(W627EHF_INDEX_PORT, W627EHF_REG_LD);
	outportb(W627EHF_DATA_PORT, LD);
	Lock_W627EHF();
}
```

```
//============================================================================
void Set_W627EHF_Reg( unsigned char REG, unsigned char DATA)
{
        Unlock_W627EHF();
        outportb(W627EHF_INDEX_PORT, REG);
        outportb(W627EHF_DATA_PORT, DATA);
        Lock_W627EHF();
}
//============================================================================
unsigned char Get_W627EHF_Reg(unsigned char REG)
{
        unsigned char Result;
        Unlock_W627EHF();
        outportb(W627EHF_INDEX_PORT, REG);
        Result = inportb(W627EHF_DATA_PORT);
        Lock_W627EHF();
        return Result;
}
//============================================================================
```

```
//============================================================================
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//============================================================================
#ifndef __W627EHF_H
#define __W627EHF_H                     1
//============================================================================
#define         W627EHF_INDEX_PORT          (W627EHF_BASE)
#define         W627EHF_DATA_PORT           (W627EHF_BASE+1)
//============================================================================
#define         W627EHF_REG_LD              0x07
//============================================================================
#define W627EHF_UNLOCK                      0x87
#define         W627EHF_LOCK                0xAA
//============================================================================
unsigned int Init_W627EHF(void);
void Set_W627EHF_LD( unsigned char);
void Set_W627EHF_Reg( unsigned char, unsigned char);
unsigned char Get_W627EHF_Reg( unsigned char);
//============================================================================
#endif  //__W627EHF_H
```

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